

MEXICAN DRAINAGE

Within the upper Gila planning area there are three areas that drain south into Mexico: the southern part of Sulphur Springs Valley, the San Bernardino Valley, and the San Rafael Valley.

The San Bernardino and the southern Sulphur Springs Valley are part of the Yaqui River watershed of northern Mexico which eventually drains into the Gulf of California near Guaymas (Coates and Cushman, 1955). The San Rafael Valley primarily is drained by the Santa Cruz River. This river flows out of Arizona near Lochiel but returns to the state within the Tucson AMA, east of Nogales. A small area of the eastern San Rafael Valley drains into the Mexican portion of the San Pedro River watershed. The San Pedro River enters the United States about 30 miles east of San Rafael Valley.

SULPHUR SPRINGS VALLEY

The Sulphur Springs Valley is located in southeastern Arizona and trends southeast to northwest from northern Mexico to the Gila River. Elevations range from 7,185 feet above mean sea level in the Swisshelm Mountains to less than 3,900 feet above mean sea level at the International Boundary near Douglas. The southern part of the valley, which drains south into Mexico, is part of the Yaqui River watershed. The area draining into Mexico is bounded on the north by small hills that form a surface-water drainage divide that separates it from the Willcox basin. The valley is bounded on the west by the Mule and Dragoon Mountains, and on the east by the Chiricahua, Pedregosa and Perilla Mountains. The Town of Douglas, approximately 120 miles southeast of Tucson, lies in the southern part of the valley on the International Boundary.

The southern Sulphur Springs Valley is drained by Whitewater Draw which exits the United States near Douglas, Arizona (Figure 18). The headwaters of Whitewater Draw occur in Rucker Canyon in the Chiricahua Mountains and sustain perennial flow for about seven miles (Brown and others, 1981). The stream channel remains distinct until it reaches the center of the basin near Elfrida, where it becomes lost in the agricultural area. Whitewater Draw again becomes well-defined south of Elfrida and continues across the International Boundary as part of the Yaqui River watershed (Coates and Cushman, 1955). The two-mile reach immediately north of the International Boundary historically has been perennial, but widespread groundwater pumping lowered water levels thereby affecting base flow. Whitewater Draw ceased being perennial in 1976; the reach is now intermittent with seasonal flow resulting from summer monsoons and winter snowmelt (Harshbarger, 1979).

The only perennial stream in the basin is Leslie Creek which sustains surface flow across a hard-rock area for approximately two miles. All other streams in the valley are ephemeral and only flow in response to precipitation events (Brown and others, 1981). The U.S. Geological Survey has measured streamflow at two locations in the southern portion of Sulphur Springs Valley. Table 31 lists the average discharge for these stations.

TABLE 31
ANNUAL FLOWS FOR USGS STREAMGAGING STATIONS IN SOUTHERN SULPHUR SPRINGS VALLEY
(SOUTHEASTERN ARIZONA PLANNING AREA)

Station Name	Station Number	Period of Record	Mean Annual Flow (ac-ft)	Median Annual Flow (ac-ft)	Record Annual High Flow (ac-ft)	Record Annual Low Flow (ac-ft)
Leslie Creek	9537200	1970-1977 1983-1990	940	670	4,780	50
Whitewater Draw near Douglas	9537500	1919, 1931-1933 1936-1946 1949-1982	6,730	5,600	23,890	230

Source: U.S. Geological Survey, 1992, National Water Information System

The Arizona Department of Environmental Quality (1990) has reported high levels of metals, turbidity, and ammonia in Mule Gulch and Whitewater Draw. These exceedances are believed to be a result of mining in the Bisbee area.

SAN BERNARDINO VALLEY

The San Bernardino Valley is located in the extreme southeast corner of Arizona, about 150 miles from Tucson (Figure 18). The valley drains south into Mexico and is bounded on the east by Peloncillo Mountains and on the west by the Pedregosa and Perilla Mountains. Elevations in the San Bernardino Valley range from over 6,400 feet above mean sea level in the Pedregosa Mountains to less than 3,838 feet above mean sea level at the International Boundary.

San Bernardino Valley is dissected by ephemeral streams that flow only in response to precipitation events. In the central valley, north of the International Boundary, discharges from flowing artesian wells and springs supply a wetlands habitat that supports a variety of fish and wildlife (Longworth, 1991). This area, which encompasses about 2,300 acres of the valley, is known as the San Bernardino National Wildlife Refuge. In the Refuge area, groundwater occurs under confined conditions in the lower basin-fill. Nine of the ten Refuge wells flow at land surface. The Refuge was established in 1982 by the U.S. Fish and Wildlife Service to protect the area from cattle grazing and land clearing for farming (Longworth, 1991).

Black Draw, the main drainage for surface water in the San Bernardino Valley, is ephemeral for most of its length. Black Draw becomes perennial from springs discharging into the channel, just north of the International Boundary (Longworth, 1991). Surface water flow across the International Boundary from all of the streams draining the San Bernardino Valley has been estimated at 5,000 acre-feet per year (Harshbarger, 1979 after U.S. Geological Survey, 1976).

SAN RAFAEL VALLEY

The San Rafael Valley is located in southern Arizona along the International Boundary about 75 miles southeast of Tucson (Figure 18). It is bounded on the east by the Huachuca Mountains and on the west by the Patagonia Mountains. Elevations in the San Rafael Valley area range from over 8,400 feet above mean sea level in the Huachuca Mountains to less than 4,620 feet above mean sea level at the International Boundary.

The Valley contains a surface-water divide that separates the drainage into two watersheds, the Santa Cruz River and San Pedro River. The majority of the Valley is drained by the Santa Cruz River which flows south into Mexico, then flows north into Arizona near Nogales. The Santa Cruz River enters the Tucson Active Management Area at the point where it crosses the International Boundary.

A small area in eastern San Rafael Valley drains south into the Mexican portion of the San Pedro River watershed. The San Pedro River flows north and crosses the International Boundary into the United States about 30 miles east of the San Rafael Valley.

There are two perennial streams within the San Rafael Valley. Table 32 lists the approximate lengths of the flows. All other streams in the San Rafael Valley are ephemeral and only flow in response to precipitation events.

TABLE 32

PERENNIAL STREAM REACHES IN THE SAN RAFAEL VALLEY

Perennial Stream Reaches	Length (miles)
Santa Cruz	3
Parker Canyon	6
unnamed reach	1

unnamed reach

1

Source: Brown and others, 1981

The U.S. Geological Survey maintains a streamgage (#09480000) on the Santa Cruz River just north of the International Boundary near Lochiel, Arizona. The average discharge for 39 years of record (1949-1988) was 2,910 acre-feet per year (U.S. Geological Survey, 1989). The total average annual discharge from the San Rafael Valley area into the Santa Cruz River watershed in Mexico has been estimated to be 3,800 acre-feet for the period 1940-46 and 1952-76 (Harshbarger, 1979). Runoff from the 56 square miles of San Rafael Valley that drain into the San Pedro River watershed in Mexico is estimated to average 6,220 acre-feet per year (Harshbarger, 1979 after U.S. Geological Survey, 1976).